

# Ultraviolet radiation and life at high altitude – Licancabur 2004

Andrew N. Hock

*Department of Earth and Space Sciences*

*University of California, Los Angeles*

*Los Angeles, CA 90095-1567*

*USA*

[ahock@ucla.edu](mailto:ahock@ucla.edu)

Nathalie A. Cabrol and Edmond A. Grin

*NASA Ames Research Center*

*SETI Institute*

*USA*

Lynn J. Rothschild

*NASA Ames Research Center*

*USA*

and the Mars Underwater Project Science Team

We present solar ultraviolet data taken at Licancabur Volcano, Bolivia (22°50' S, 67°53' W) from 4300-5900 m.a.s.l. and consider its implications on endemic biology and the search for life. At Laguna Blanca, a hypersaline lake at 4300 m elevation, we recorded one year of UV-B, UV-A, and PAR flux using an Eldonet 3-channel radiometer installed on the lake shore. Preliminary findings indicate that peak daily ultraviolet flux reaches nearly 200% of that predicted at sea level. At the summit lake, one of the world's highest at an altitude of 5916 m, we used a handheld radiometer to measure UV-B and UV-A flux as a function of depth in the upper water column. We have calculated attenuation in each channel as a function of depth and—considering the effects of UV radiation on aquatic life—map out available habitats. In both of these environments, as we suppose on Mars and elsewhere, high ultraviolet flux is a primary physical constraint on life and its habitats.